MFWG

PREPARED BY:

SYSTEM: DEC SUBSYSTEM PROJECT: SAMS ASS'Y NOMENCLATURE: DEC PANEL SRELL: [...] CRITICAL ITEMS LIST ASS'Y P/N: 51140E391 RATIONALE FOR ACCEPTANCE HDWR / FUNC. 2/1RB FAILURE EFFECT FALLURE MODE NAME, GTY, & DRAWING REF. FMEA ON SCREENS: A-PASS, B-FAIL, C-PASS REV. **ERITICALITY** END ITEM CAUSE . DESIGNATION DESIGN FEATURES LOSS OF CAPTURE END EFFECTOR HODE: 1 290 AND RELEASE IN LOSS OF AUTO/OFF/ TOGGLE SWITCHES USED ON THE DEC PANEL ARE HERMETICALLY SEALED, AUTO OR MANUAL MAHUAL OR MANUAL MODE AUTO CAP/REL HODES. AND OF A MATURE AND PROVEN DESIGN. THESE SHITCHES ARE IN SWITCH ARM WILL REMAIN FUNCTION. COMMON USE ON THE ORBITER VEHICLE. 011-1 LIMP AFTER AUTO P/N ME THE SWITCHES ARE CONTROLLED BY ROCKWELL INTERNATIONAL SPECIFICATION NC 452-0102 AND HAVE BEEN QUALIFIED TO THE CAPTURE SEQ CAUSE(S): 452-0102-(1) AUTO OR MAN CAP/REL ATTEMPTED. 7306 REQUIREMENTS OF THIS SPECIFICATION. ED 92020 WORST CASE CONTACT FAIL SHEET 3 ELECTRICAL CONNECTIONS TO THE SWITCH ARE ACHIEVED BY MEANS OF UNEXPECTED SOLDERABLE TERMINALS. PAYLOAD MOTION. (2) CAP/REL POLE FAIL IN WIRING TO SWITCH TERMINALS UTILIZES HICKEL PLATED CONDUCTORS WITH A POLYAMID INSULATION. SOLDERING OF THE MICKEL PLATED WIRE TO THE SWITCH TERMINALS IS CONTROLLED BY CAE PROCESS INCOMPLETE CAPTURE/ AUTO OR RELEASE MANUAL SEQUENCE. POSITION. SPECIFICATION PD 91059. UNABLE TO RELEASE THE WIRING HARNESS IS DESIGNED TO BE CAPABLE OF SEPARATE TESTING FOR INSULATION RESISTANCE, DIELECTRIC STRENGTH, AND PAYLOAD. CREW ACTION CONTINUITY). MOUNTING OF THE SWITCH TO THE D&C PANEL IS BY MEANS OF A 15/32 NUT WHICH ENCAGES A THREADED BUSHING ON THE SWITCH. A KEYED WASHER PROVIDES ROTATION RESTRAINT. AFTER INSTALLATION AND REDUNDANT PATHS REMAINING TOROUING, THE NUT IS STAKED TO THE PANEL BY A BLOW OF EPOXY ADMESTVE. A STATIKLESS STEEL GUARD PROTECTS THE SWITCH LEVER 13 OTHER EE PRIMARY MODE AGAINST DAMAGE OR INADVERTENT OPERATION. CTD CONTINUE AMALYSIS OF THE BASIC PANEL STRUCTURE HAS DEMONSTRATED THAT THERE ARE NO RESONANCES IN THE RELEVANT VIBRATION FREQUENCY OPERATIONS). SPECTRUM. THIS ANALYSIS HAS BEEN VERIFIED BY VIBRATION TESTING 2) BACKUP EE RELEASE (TO OF THE DAC PANEL ASSEMBLY. SECURE APPLICATION ANALYSIS HAS CONFIRMED THAT ADEQUATE ELECTRICAL ORBITER). STRESS MARGINS ARE ACHIEVED. AT THE PART LEVEL, QUALIFICATION/CERTIFICATION TESTING 1S DEFINED BY ROCKWELL INTERNATIONAL SPECIFICATION MC452-0102. THIS TEST REQUIREMENT INCLUDES: INSULATION RESISTANCE. DIELECTRIC STRENGTH, CONTACT RESISTANCE, OF THE STRENGTH, CONTACT RESISTANCE, RANDOM VIBRATION (48 MINUTES PER AXIS) LEAKAGE AT ONE ATMOSPHERE DIFFERENTIAL PRESSURE, TOGGLE STRENGTH. FOR SWITCH OPERATIONAL CYCLES REFER TO TABLE 13. ALL UNITS ARE SUBJECTED TO ACCEPTANCE TESTS WHICH INCLUDE PRE-ACCEPTANCE RUN-IN, DIELECTRIC STRENGTH, INSTALLATION RESISTANCE, CONTACT RESISTANCE, ACCEPTANCE VIBRATION, SEAL TEST, VISUAL EXAMINATION, AND RADIOGRAPHIC INSPECTION.

> APPROVED BY: RMS/D&C - 74

SUPERCEDING DATE: 06 OCT 87

DATE: 24 JUL 91

CIL REV: 2

CRITICAL ITEMS LIST

FMEA FMEA REF. REV.	MAME, Q1Y, & DRAWING REF.	FAILURE MODE	FAILURE EFFECT ON	HDWR / FUNC. 2/188	RATIONALE FOR ACCEPTANCE
	DESIGNATION	CAUSE	END ITEM	CRITICALITY	SCREEMS: A-PASS, B-FAIL, C-PASS
290 1	END EFFECTOR AUTO/OFF/ MANUAL MODE SHITCH 9TY-1 P/N ME 452-0102- 7306 ED 92020 SHEET 3	MODE: LOSS OF MANUAL OR AUTO CAP/REL FUNCTION. CAUSE(S): (1) AUTO OR HAN CAP/REL CONTACT FAIL O/C. (2) CAP/REL POLE FAIL IN AUTO OR MANUAL POSITION.	LOSS OF CAPTURE AND RELEASE IN AUTO OR MANUAL MODES. ARM WILL REMAIN LIMP AFTER AUTO CAPTURE SEQ ATTEMPTED. WORST CASE UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/ RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQ. REDUNDANT PATHS REMAINING 1) OTHER EE PRIMARY MODE (TO CONTINUE OPERATIONS). 2) BACKUP EE RELEASE (TO SECURE ORBITER).	ENVIRONMENTAL O VIBRATION: O THERMAL: THE DIC PANEL SYSTEM TESTS TEST) WHICH VI QUALIFICATION THE SWITCH IT! PANEL ASSEMBL QUALIFICATION: O VIBRATION: O THERMAL: O HUMIDITY: O EMC: FLIGHT CHECKO	TIEM IS SUBJECTED TO THE FOLLOWING ACCEPTANCE TESTS AS PART OF THE DZC PANEL ASSEMBLY. LEVEL AND DURATION - REFERENCE TABLE 1 +110 DEGREES F TO PLUS 10 DEGREES F (2 CYCLES - 9.5 MRS/CYCLE.) ASSEMBLY IS FURTHER TESTED AS PART OF THE RMS (TPS1B RMS STRONGBACK TEST AND TPS52 FLAT FLOOR ERIFIES THE ABSENCE OF THE FAILURE MODE. TESTS EM HAS BEEN QUALIFIED FOR ORBITER USE. THE D&C Y HAS BEEN SUBJECTED TO THE FOLLOWING TEST ENVIRONMENTS. LEVEL AND DURATION - REFERENCE TABLE 1 20G/11 MS - 3 AXES (6 DIRECTIONS) 130 DEGREES F 10 -23 DEGREES F (12 HRS PER CYCLE) (6 CYCLES) 95X (120 DEGREES F TO 82 DEGREES F CYCLE-IN 16 HRS) 10 CYCLES TOTAL. MIL-STO-461 AS MODIFIED BY SL-E-0002 (TEST CED1, CEO2, CEO3, CSO1, REO2 (B/N), RSO2, RSO3, RSO4)

PREPARED BY:

DATE: 24 JUL 91

CIL REV: 2

FMEA REF.	FNEA REV.	NAME OTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END 11EM	HDWR / FUNC. RATIONALE FOR ACCEPTANCE 2/1RB CRITICALITY SCREENS: A-PASS, B-FAIL, C-PASS
290		END EFFECTOR AUTO/OFF/ MANUAL MODE SWITCH QTY-1 P/N ME 452-0102- 7306 ED 92020 SHEET 3	MODE: LOSS OF MANUAL OR AUTO CAP/REL FUNCTION. CAUSE(S): (1) AUTO OR MAN CAP/REL CONTACT FAIL O/C. (2) CAP/REL POLE FAIL IN AUTO OR MANUAL POSITION.	LOSS OF CAPTURE AND RELEASE IN AUTO DE MANUAL MODES. ARM WILL REMAIN LIMP AFTER AUTO CAPTURE SEQ ATTEMPTED. WORST CASE UNEXPECTED PAYLOAD MOTIOM. INCOMPLETE CAPTURE/ RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQ. REDUNDANT PATHS REMAINING. 1) OTHER EE PRIMARY MODE (TO CONTINUE OPERATIONS). 2) BEASE (TO SECURE ORSITER).	HERMETICALLY SEALED TOGGLE SWITCHES ARE PROCURED TO ROCKWELL SPECIFICATION MC652-0102. ROCKWELL PART NO. MC452-0102. GUALIFICATION AND ACCEPTANCE TESTING OF SWITCHES IS PERFORMED TO R.I. SPEC. MC652-0102. RECEIVING INSPECTION VERIFIES THAT SWITCHES RECEIVED ARE AS IDENTIFIED IN THE PROCUREMENT DOCUMENTS, THAT NO PHYSICAL DAMAGE HAS OCCURRED TO SWITCHES DURING SHIPPENT, THAT INE RECEIVING DOCUMENTS PROVIDE ADEQUATE TRACEABILITY INFORMATION AND ACCEPTANCE TEST DATA IDENTIFIES ACCEPTABLE PARTS. PARTS ARE INSPECTED THROUGHOUT MANUFACTURE AND ASSEMBLY AS APPROPRIATE TO THE MANUFACTURING STAGE COMPLETED. THESE TRYPECTIONS INCLUDE, COMPONENT MOUNTING TO FRONT PANEL INSPECTION, SOLDERING OF WIRES TO SMITCH CONTACTS, WIRE ROUTING, SIRESS RELIEF OF WIRES ETC., OPERATORS AND INSPECTIOS ARE HANNED AND CERTIFIED TO HASA MHB 3500.4(3A) STANDARD, AS MODIFIED BY JSCOBBOOA. PRE-TEST INSPECTION OF DEC PANEL ASSY INCLUDES AN AUDIT OF LOWER TIER INSPECTION COMPLETION, AS BUILD CONTIGURATION VERTIFICATION OF AS DESIGN ETC. (SPAR/GOVERNMENT REP WANDATORY INSPECTION POINT) A TEST READINESS REVIEW (TER) WHICH INCLUDES VERIFICATION OF TEST PERSONNEL, TEST DOCUMENTS, TEST EQUIPMENT CALIBRATION/ VALIDATION STATUS AND HARDWARE CONFIGURATION IS CONVENED BY QUALITY ASSURANCE IN COMMUNICATION WITH ENGINEERING RELIBBATION/ VALIDATION STATUS AND HARDWARE CONFIGURATION TO THE START OF ANY FORMAL TESTING (ACCEPTANCE OR QUALIFICATION). ACCEPTANCE TESTING (ATP) INCLUDES ANDIERT REP. MANDATORY INSPECTION POINT). AND THE GRATION OF DAC PANEL RULLY PRIOR TO THE START OF ANY FORMAL TESTING (ACCEPTANCE OR QUALIFICATION). WHICH INCLUDES GROUNDING CHECKS, INTER CONNECT CABLE VERTIFICATION, CONNECTOR INSPECTION FOR BENT OR PUSHBACK CONTACTS ETC. SUB-SYSTEM PERFORMANCE TESTING, (SPAR/GOVERNMENT REP MANDATORY INSPECTION SARE PERFORMED AT EACH PHASE OF INTEGRATION MINCH INCLUDES GROUNDING CHECKS, HARD WIRDS OF INTEGRATION MINCH INCLUDES AND THE FLIGHT CABINE GUIPPENT TO FORM THE SAMS. INSPECTIONS ARE PERFORMED AT EACH PHASE OF INTEGRATION MINCH
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SUPERCEDING DATE: 06 OCT 87

APPROVED BY:

CRITICAL ITEMS LIST

PREPARED BY:

HFMG

PROJECT: SRMS ASS'Y NOMENCLATURE: DEC PANEL SYSTEM: DEC SUBSYSTEM ASS'Y P/N: 51140E391 SHEET: __4 HDWR / FUNC. 2/1RB RATIONALE FOR ACCEPTANCE NAME OTY & DRAWING REF. FAILURE HODE FAILURE EFFECT FHEA FHEA AND OH REF. REV. CAUSE END ETEM CRITICALITY SCREENS: A-PASS, B-FAIL, C-PASS DESIGNATION LOSS OF CAPTURE FAILURE HISTORY END EFFECTOR MODE: 290 1 AUTO/OFF/ HANUAL MODE LOSS OF AND RELEASE IN MANUAL OR AUTO CAP/REL AUTO OR MANUAL THERE HAVE BEEN NO FAILURES ASSOCIATED WITH THIS FAILURE HODES. SW1 TCH ARH WILL REMAIN LIMP AFTER AUTO FUNCTION. MODE ON THE SRMS PROGRAM. QTY-1 P/N ME CAUSE(S): (1) AUTO OR MAN CAP/REL 452-0102-CAPTURE SEQ ATTEMPTED. 7306 ED 92020 SHEET 3 CONTACT FAIL WORST CASE O/C. UNEXPECTED PAYLOAD HOTION. INCOMPLETE (2) CAP/REL POLE FAIL IN AUTO OR CAPTURE/ RELEASE MANUAL POSITION. SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQ. REDUNDANT PATHS REMAINING 1) OTHER EE PRIMARY MODE (TO CONTINUE ÓPERÁTIONS). 2) BACKUP EE RELEASE (10 SECURE ORBITER). APPROVED BY: DATE: 24 JUL 91 CIL REV: 2 SUPERCEDING DATE: 06 OCT 87

FMEA REF.	FMEA REV.	MAME, QTY, & DRAWING REF.	FAILURE MODE AND LAUSE	FAILURE EFFECT ON END ITEM	HOWR / FUNC. RATIONALE FOR ACCEPTANCE 2/1RB CRITICALITY SCREENS: A-PASS, B-FAIL, C-PASS
290	1	DESIGNATION END EFFECTOP AUTO/OFF/ MAMUAL MODE SWITCH GIY-1 P/N ME 452-0102- 7306 ED 92020 SHEET 3	MODE: 10SS OF MIPAL OR J CAP/REL IURCTION. CAUSE(S): (1) AUTO OR MAN CAP/REL CONTACT FAIL O/C. (2) CAP/REL POLE FAIL IN AUTO OR MANUAL POSITION.	LOSS OF CAPTURE AND RELEASE IN AUTO OR MANUAL MODES. ARM WILL REMAIN LIMP AFTER AUTO CAPTURE SEQ ATTEMPTED. WORST CASE UMEMPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/ RELEASE SEQUENCE. UMABLE TO RELEASE PAYLOAD. CREW ACTION REQ. REDUNDANT PATHS REMAINING 1) OTHER EE PRIMARY MODE (TO CONTINUE OPERATIONS). 2) BACKUP EE RELEASE (TO SECURE ORBITER).	OPERATIONAL EFFECTS EE DOES NOT OPERATE NOMINALLY WHEN COMMANDED. ARM REMAINS LIMP UNTIL EE NODE SWITCH IS TURNED OFF DURING AN AUTO CAPTURE SEQUENCE. CREW ACTION FOR ANY OFF NOMINAL OPERATION OF THE EE, THE EE MODE SWITCH SHOULD BE TURNED OFF. ATTEMPT TO CAPTURE IN THE ALTERNATE MODE. IF THE SWARES REMAIN OPEN, MANEUVER ARM AWAY FROM PAYLOAD. IF THE SHARES ARE PARTIALLY CLOSED, ATTEMPT RELEASE USING A PRIMARY ER MODE. IF SWARES DOEN, MANEUVER THE ARM AWAY FROM THE PAYLOAD. IF SWARES DOEN, MANEUVER ARM AWAY FROM THE PAYLOAD. IF SWARES OPEN, MANEUVER ARM AWAY FROM THE PAYLOAD. AMNEUVER ROBITER AWAY FROM PAYLOAD. IF SWARES CAMMOT BE OPENED IN ANY MODE, THEN EVA CAN BE USED TO RELEASE THE PAYLOAD OR THE ARM/PAYLOAD CONBINATION CAN BE JETTSONED. CREW WILL BE TRAINED TO RECOGNIZE OFF NOMINAL EE OPERATIONS AND TO MANEUVER THE ORBITER AWAY FROM A FREE FLYING PAYLOAD AT ANY TIME DURING ARM OPERATIONS. MISSION CONSTRAINT WHEN CAPTURING A FREE FLYING PAYLOAD, THE EE MUST BE FAR ENOUGN AWAY FROM STRUCTURE TO PROHIBIT CONTACT REGARDLESS OF PAYLOAD ROTATIONS. THE EE MODE SWITCH SHOULD BE RETURNED TO THE OFF POSITION IMMEDIATELY AFTER SPEC DRIVE TIME HAS ELAPSED.
			j		OMRSD OFFLINE EXERCISE D&C PANEL EE AUTO/MANUAL MODE SWITCH TO BOTH AUTO AND MANUAL. SELECT CAPTURE / RELEASE. VERIFY VOLTAGE AT D&C PANEL OUTPUT. VERIFY CORRECT BITS IN DATA BUS. OMRSD ONLINE INSTALLATION EXERCISE D&C PANEL EE AUTO/MANUAL MODE SWITCH TO BOTH AUTO AND MANUAL, SELECT CAPTURE / RELEASE. VERIFY VOLTAGE AT LONGERON INTERFACE. OMRSD ONLINE TURNAROUND

CRITICAL ITEMS LIST

PREPARED BY:

MFWG

SYSTEM: D&C SUBSYSTEM ASS'Y P/N: 51140E391 ASS'Y NOMENCLATURE: DEC PANEL SHEET: FAILURE EFFECT HDWR / FUNC. 2/1RB RATIONALE FOR ACCEPTANCE FAILURE HODE HAME, QTY, & DRAWING REF. FMEA REF. FMEA REV. ON END ETEM AND CRITICALITY SCREENS: A-PASS, B-FAIL, C-PASS DESIGNATION LOSS OF CAPTURE AND RELEASE IN MODE: LOSS OF END EFFECTOR 290 EXERCISE ALL DEC PAHEL EE MODES. AUTO/OFF/ VERIFY CORRECT OPERATION OF EE AND EE TALKBACK FLAGS. AUTO OR MANUAL MANUAL OR AUTO CAP/REL SOON JAUNAM MODES. SWLTCH ARM WILL REMAIN FUNCTION. 01Y-1 LIMP AFTER AUTO P/N ME CAPTURE SEQ ATTEMPTED. CAUSE(S): 452-0102-(1) AUTÓ OR MAH CAP/REL 7306 ED 92020 SHEET 3 WORST CASE CONTACT FAIL O/C. UNEXPECTED PAYLOAD MOTION. (2) CAP/REL POLE FAIL IN INCOMPLETE AUTO OR MANUAL CAPTURE/ RELEASE SEQUENCE. POSITION. UNABLE TO RELEASE PAYLOAD. CREW ACTION REO. REDUNDANT PATHS REMAINING 1) OTHER EE PRIMARY MODE (TO CONTINUE OPERATIONS). 2) BACKUP EE RELEASE (TO SECURE DRBITER). DATE: 24 JUL 91 CIL REV: 2 APPROVED BY: SUPERCEDING DATE: 06 OCT 87